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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/805,593	03/19/2004	Jack B. Andersen	D2A1190-1	9249

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EXAMINER	
BRINEY III, WALTER F	

ART UNIT	PAPER NUMBER
2614	

MAIL DATE	DELIVERY MODE
12/11/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/805,593	ANDERSEN ET AL.	
	Examiner	Art Unit	
	WALTER F. BRINEY III	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 September 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16 and 18-21* is/are pending in the application.

4a) Of the above claim(s) *13-16,18 and 19* is/are withdrawn from consideration.

5)☒ Claim(s) *11* is/are allowed.

6)☒ Claim(s) *1,2,4-9,20 and 21* is/are rejected.

7)☒ Claim(s) *3,10 and 12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05 September 2008 has been entered.

Election/Restrictions

Applicant's election without traverse of species I in the reply filed on 05 September 2008 is acknowledged. **Claims 13-16 and 18-19** are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claim 1-2, 4-9 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,875,250 (patented 23 February 1999) ("*Kuo*") in view of US Patent 5,907,482 (patented 25 May 1999) ("*Otake*").

Claim 1 is limited to a system. The system of this claim comprises two elements and three "wherein" clauses. The first element is "a plurality of digital pulse width modulation (PWM) controller chips." *Kuo* discloses a "Single Package Three Channel Audio Signal Amplifier." Within that single package are, at least, three separate H-bridge controllers operating according to pulse width modulation techniques to provide audio to a speaker and corresponding to the claimed PWM controller chips. *Kuo* at col. 2 ll. 62-67.

The second element is "a synchronization line connected to each of the plurality of chips." This element is not disclosed by *Kuo*, but this deficiency will be treated *infra*. The first "wherein" clause requires the following:

> "wherein one of the plurality of chips is a master, and the remainder of the plurality of chips are slaves."

Kuo discloses linking one of the controllers as a slave to another controller, such that one controller must be a master. *Id.* at col. 3 ll. 4-6.

The second and third "wherein" clauses requires the following:

> "wherein the master is configured to generate a synchronization signal on the synchronization line; and
>
> wherein each of the slaves is configured to detect the synchronization signal and, in response to detecting the synchronization signal, to begin generating a corresponding PWM audio output signal which has a known phase relationship to PWM audio output signals generated by the other PWM controller chips."

Since both of these limitations are functionally related to the claimed synchronization line absent from *Kuo*, these limitations are likewise not disclosed by *Kuo*. These deficiencies of *Kuo*, however, are corrected by an obvious modification.

First, one of ordinary skill in the art at the time of Applicant's invention is required to somehow "slave" one h-bridge controller to another h-bridge controller "if further power is desired." *See id.* In other words, two or more h-bridge controllers can be made to amplify synchronously to increase the power delivered in parallel to a single load. *See id.* at col. 1 ll. 9-13, 65-67, col. 2 ll. 1-2, 47-51, 54-61. A further observation is that each h-bridge controller is identical. *Id.* at col. 2 ll. 28-32.

Otake teaches one known method suitable to providing slaved PWM controllers entitled "Power Supply Control Device." According to *Otake*, the identical controllers used by *Kuo* can be master-slave coupled by including an oscillator in a master that synchronizes the operation of the slave over a synchronization line. *Otake* at col. 1 ll. 47-58, fig.2. *Also see id.* at col. 4 ll. 39-46, 57-67 (disclosing that the prior art method of master-slave coupling two PWM controllers, depicted in fig.2, operates sufficiently well unless two different types of controllers are employed—ordinary rectification type with synchronized rectification type.) The slave in *Otake* has its own oscillator that operates in response to a synchronization signal from the master, such that the slave oscillator detects the synchronization signal from the master and begins operation in response. *Id.* at col. 3 ll. 12-27. Moreover, the slave oscillator has an identical phase with the master. *Id.* The synchronization method of *Otake* advantageously causes the master and slave to operate at the same frequency, such that they have no "switching beat." *See id.* at col. 1

ll. 26-40. Accordingly, one of ordinary skill in the art at the time of Applicant's invention would have found the claimed synchronization line and the functions of the latter two "wherein" clauses obvious. Therefore, *Kuo* in view of *Otake* makes obvious all limitations of the claim.

Claim 2 is limited to the system of claim 1. Within that single package are, at least, three separate H-bridge controllers operating according to pulse width modulation techniques to provide audio to a speaker and corresponding to the claimed PWM controller chips. *Kuo* at col. 2 ll. 62-67.

Claim 4 is limited to the system of claim 1. *Kuo* discloses linking one of the controllers as a slave to another controller, such that one controller must be a master. *Kuo* at col. 3 ll. 4-6. This inherently requires determining a master.

Claim 5 is limited to the system of claim 1. Each h-bridge controller in K*uo* is identical. *Kuo* at col. 2 ll. 28-32.

Claim 6 is limited to the system of claim 1. *Otake* discloses that the synchronization signal from master to slave is a triangular pulse. *Otake* at col. 3 ll. 6-11. A pulse inherently transitions from passive to active (i.e. low to high, or vice versa).

Claim 7 is limited to the system of claim 6. *Otake* discloses that the synchronization signal operates at a predetermined oscillation frequency, such that it transitions at fixed intervals. *Id.* at col. 3 ll. 16-27.

Claim 8 is limited to the system of claim 7. *Otake* discloses that the synchronization signal from master to slave is a triangular pulse. *Id.* at col. 3 ll. 6-11. A pulse inherently has a fixed period for an active state.

Claim 9 is limited to the system of claim 8. *Otake* discloses that the slave unit samples the synchronization signal to begin operation. *Id.* at col. 3 ll. 16-27.

Claim 21 is limited to the system of claim 1. This claim requires the following:

> "wherein the output signal of each PWM controller chip has a corresponding audio signal phase, and wherein the system is configured to align the audio signal phases of the output signals of the PWM controller chips."

Otake discloses that the slave oscillator has an identical phase with the master. *Id.* at col. 3 ll. 12-27.

2. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Kuo* in view of *Otake* and further in view of US Patent 6,731,162 B2 (filed 03 June 2002) ("*Yeongha*").

Claim 20 is limited to the system of claim 1. This claim requires the following:

> "wherein the output signal of each PWM controller chip has a corresponding PWM switching phase, and wherein the system is configured to stagger the PWM switching phases of the output signal of the PWM controller chips."

To the contrary, *Otake* discloses that the slave oscillator has an identical phase with the master. *Id.* at col. 3 ll. 12-27. However, *Yeongha* teaches staggering the switching of PWM audio output channels to minimize the cross talk between the channels. *Yeongha* at col. 1 ll. 7-16, 19-26. Accordingly, one of ordinary skill in the art at the time of Applicant's invention would have found staggering PWM switching phases obvious.

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter:

3. Claims 3, 10 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 3 is limited to the system of claim 1. This claim is allowable over the cited prior art because neither *Kuo* nor *Otake* discloses a master configured to detect the synchronization signal it generates.

Claim 10 is limited to the system of claim 9. *Otake* does not disclose that the master-slave coupling includes a slave circuit to take multiple samples during a fixed period and determine the active state base upon a majority of the multiple samples. *See id.* Thus, this claim is allowable over the cited prior art.

Claim 12 is limited to the system of claim 9. *Otake* does not disclose filtering samples of the synchronization line. *See id.* Thus, this claim is allowable over the cited prior art.

4. Claim 11 is allowed.

Claim 11 is limited to a system. This claim is essentially claim 9 written in independent format and including the further limitation that each slave samples the synchronization line at two different rates. This limitation is taught by neither *Kuo* nor *Otake* and, thus, this claim is allowable over the cited prior art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WALTER F. BRINEY III whose telephone number is (571) 272-7513. The examiner can normally be reached on M-F 8am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A. Kuntz can be reached on (571) 272-7499. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Walter F. Briney III/
Examiner
Art Unit 2614

12/12/08